

2 Sheets—Sheet 1.

STEAM BOILER.

Patented Aug. 21, 1888.



Inventor:
James C. Bryan,
by his Attorneys.
Houston & Houston.

(No Model.)

2 Sheets—Sheet 2.

J. G. BRYAN.

STEAM BOILER.

No. 388,340.

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Fig 2.

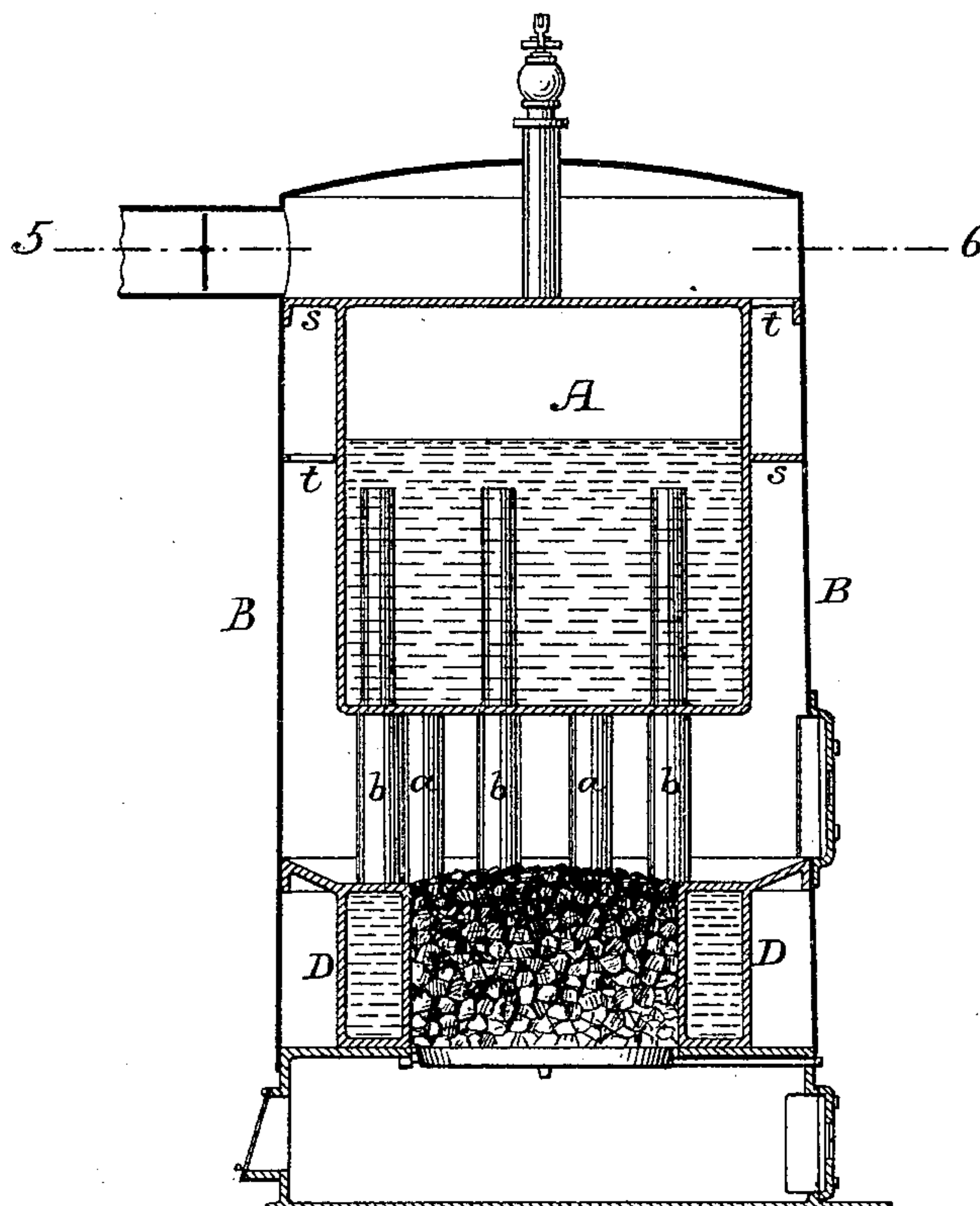
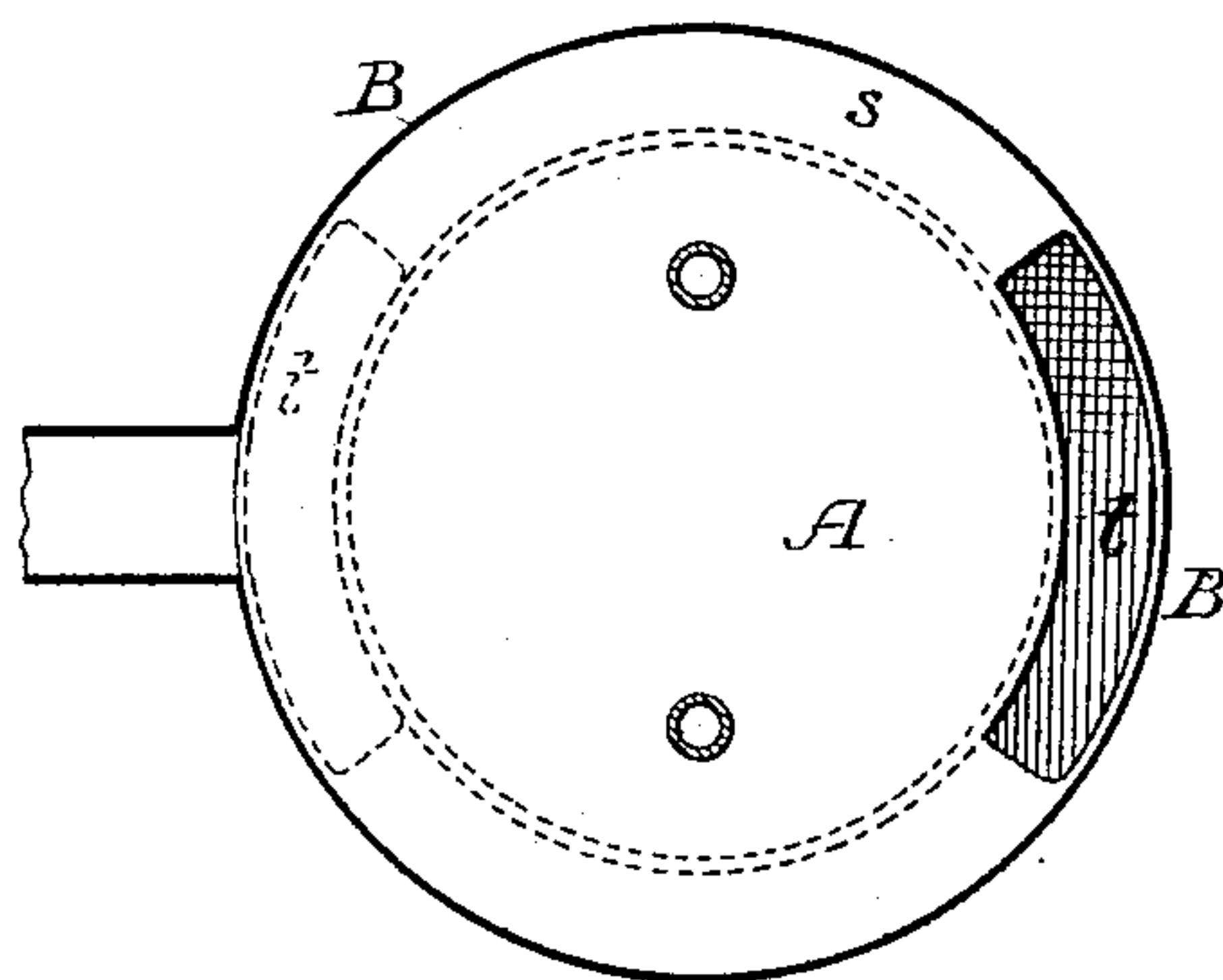


Fig 4.



Witnesses:
Alex. Barkoff
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Inventor.
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Howson & Howson.

UNITED STATES PATENT OFFICE.

JAMES G. BRYAN, OF PHILADELPHIA, PENNSYLVANIA.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 388,340, dated August 21, 1888.

Application filed January 26, 1888. Serial No. 261,984. (No model.)

To all whom it may concern:

Be it known that I, JAMES G. BRYAN, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented
5 certain Improvements in Steam-Boilers and Water-Heaters, of which the following is a specification.

One object of my invention is to so construct a steam-boiler or water-heater as to
10 maintain a constant and effective circulation of the water adjacent to surfaces in direct contact with the fuel or products of combustion, a further object being to simplify and cheapen the construction of the boiler or heater. These
15 objects I attain in the manner which I will now proceed to describe, reference being had to the accompanying drawings, in which—

Figure 1 is a transverse section of a steam-boiler or water-heater constructed in accordance with my invention; Fig. 2, a longitudinal
20 section on the line 1 2, Fig. 1; Fig. 3, a sectional plan on the line 3 4, Fig. 1; Fig. 4, a sectional plan on the line 5 6, Fig. 2; and Figs. 5 and 6 detached views of the circulating-tubes.
25

A is the water-vessel of the boiler or heater, which is contained within an outer casing, B, and is supported at some distance above the fire-pot, which consists of a water-jacket, D,
30 a series of pipes, *a*, forming communications between the lower portion of the water-vessel A and the lower part of said jacket D, and other pipes, *b*, forming a communication between the upper part of said jacket and the
35 water-vessel near the level of water therein. By this means not only is the water in the vessel A subjected to the heat of the products of combustion arising from the fuel beneath said vessel and circulating around the same
40 and around the pipes *a b*, but the water is brought into contact with the intensely heated inner wall of the water-jacket D, which forms the casing of the fire-pot. The feed-water is also introduced into the water-jacket D through
45 a pipe, *d*, in such limited quantities as may be demanded to maintain the proper level in the vessel A, and the latter is provided with safety-valve, steam and water gages, &c., as usual.

The water-vessel is supported by means of
50 the circulating-pipes *a b*, each of these pipes comprising two portions, *m* and *n*, of slightly-different diameters, the larger portion of each

pipe having at one end a right-hand screw-thread and at the other end a left-hand screw-thread, one of these threads being adapted to
55 a threaded opening in the top of the water-jacket D and the other to a threaded opening in the bottom of the water-vessel A, as shown in Fig. 1. That portion of the casing B surrounding the vessel A forms a combustion-chamber
60 through which, by means of horizontal partitions *s*, having openings *t* on opposite sides of the axis, the products of combustion are so caused to circulate as to come into contact with
65 the bottom, side walls, and top of the water-vessel, whereby a large proportion of the heat is utilized before the products of combustion are allowed to escape.

It will be observed that in carrying out my invention the communications between the
70 water-vessel and the water-jacket of the fire-pot are provided by means of simple straight pipes, all bends or elbows being avoided, and the liability of leakage due to defective joints thus materially reduced.
75

I claim as my invention—

1. The combination, in a steam-boiler or water-heater, of the water-vessel, the annular water-jacketed fire-pot, and pipes *a* and *b* extending between the vessel and water-jacket,
80 said pipes *b* projecting upward in the water-vessel and the pipes *a* projecting down into the water jacket, all substantially as specified.

2. The combination of the water-vessel, the fire-pot beneath the same, an outer casing, and
85 horizontal partitions having openings on opposite sides of the axis of the water-vessel, whereby the products of combustion are caused to circulate beneath, around, and above said vessel, all substantially as specified.
90

3. The combination of the water-vessel, the water-jacketed fire-pot and connecting-pipes, each comprising two portions, one larger in diameter than the other, the larger portion
95 having right and left screw-threads adapted to openings in the casings of the water-vessel and jacket, all substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES G. BRYAN.

Witnesses:

WILLIAM D. CONNER,
HARRY SMITH.